Coupled Loads Analysis of the Modified NASA Barge Pegasus and Space Launch System Hardware

A Coupled Loads Analysis (CLA) has been performed for barge transport of Space Launch System hardware on the recently modified NASA barge Pegasus. The barge re-design was facilitated with detailed finite element analyses by the ARMY Corps of Engineers – Marine Design Center. The Finite Element Model (FEM) utilized in the design was also used in the subject CLA. The Pegasus FEM and CLA results are presented as well as a comparison of the analysis process to that of a payload being transported to space via the Space Shuttle. Discussion of the dynamic forcing functions is included as well. The process of performing a dynamic CLA of NASA hardware during marine transport is thought to be a first and can likely support minimization of undue conservatism.